

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference SUZ-E-18441	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/JP00/05199	International filing date (day/month/year) 03/08/2000	Priority date (day/month/year) 05/08/1999
International Patent Classification (IPC) or national classification and IPC G10H1/00		
Applicant YAMAHA CORPORATION et al		



1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 7 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 30 sheets.

3. This report contains indications relating to the following items:

- | | |
|------|--|
| I | <input checked="" type="checkbox"/> Basis of the report |
| II | <input type="checkbox"/> Priority |
| III | <input checked="" type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| IV | <input type="checkbox"/> Lack of unity of invention |
| V | <input type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| VI | <input type="checkbox"/> Certain documents cited |
| VII | <input checked="" type="checkbox"/> Certain defects in the international application |
| VIII | <input checked="" type="checkbox"/> Certain observations on the international application |

Date of submission of the demand 23/02/2001	Date of completion of this report 06.11.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Naumann, O Telephone No. +49 89 2399 7468 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/JP00/05199

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

2-11,18-20,22-25, as originally filed
28-30,32-44

1,12-17,21,26,27, as received on 12/10/2001 with letter of 10/10/2001
31

Claims, No.:

1-26 as received on 12/10/2001 with letter of 10/10/2001

Drawings, sheets:

1/10-10/10 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

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4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application.
- ☒ claims Nos. 1-26.

because:

- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):
- ☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 1-26 are so unclear that no meaningful opinion could be formed (*specify*):
see separate sheet
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- ☐ no international search report has been established for the said claims Nos. .

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

- ☐ the written form has not been furnished or does not comply with the standard.
- ☐ the computer readable form has not been furnished or does not comply with the standard.

VII. Certain defects in the international application

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The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

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Re Item I

Basis of the report

As far as can be understood, the changes of the amended claims are based on the application as originally filed.

Re Item III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

It is not possible to identify the subject-matter which should represent the invention. This is due to a lack of conciseness and clarity as laid out under Re VIII herein below.

Re Item VII

Certain defects in the international application

The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document

D1: EP-A-0 837 451 (YAMAHA CORP) 22 April 1998 (1998-04-22)
is not mentioned in the description, nor is this document identified therein.

Re Item VIII

Certain observations on the international application

The application contains 15 independent claims, with
5 independent claims of the category "apparatus"
5 independent claims of the category "method"
5 independent claims of the category "medium".

Although the claims in the respective categories have been drafted as separate independent claims, they relate effectively to the same subject-matter and differ from each other only with regard to the definition of the subject-matter for which protection is

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sought and/or in respect of the terminology used for the features of that subject-matter.

The aforementioned claims therefore lack conciseness. Moreover, lack of clarity of the claims as a whole arises, since the plurality of independent claims makes it difficult, if not impossible, to determine the matter for which protection is sought, and places an undue burden on others seeking to establish the extent of the protection.

Hence, claims 1, 3, 6, 12, 14, and 17 to 26 do not meet the requirements of Article 6 PCT.

In order to avoid this deficiency, it would have been necessary to file an amended set of claims defining the relevant subject-matter in terms of a minimum number of independent claims (preferably a single independent claim in each category) followed by dependent claims covering features which are merely optional (Rules 6.4(a) PCT).

Additional Comments

Common general inventive concept

No appropriate reasons have been given by the applicant why he considers more than one than one independent claim as necessary. It is therefore also highly questionable that the subject-matter of these independent claims is linked by a common, general, and most of all **inventive** concept as necessary in view of Rule 13.1 PCT.

The subject-matter of the application seems to be, according to

Claim 1: A music reproducing apparatus

Claim 3: An telephony terminal apparatus comprising a music reproducing apparatus as claimed in claim 1.

Claim 6: A telephony terminal apparatus comprising a music reproducing apparatus as claimed in claim 1.

Claim 12: A music reproducing apparatus as claimed in claim 1 (timbre data memory not required) further comprising a memory monitor.

Claim 14: An electronic apparatus as claimed in claim 3 (timbre data memory not required) further comprising a memory monitor.

The other independent claims are corresponding method claims or claims related to a medium for a program for the operation of an apparatus as claimed in any of the above

claims.

Relation to prior art - Novelty

As far as can be understood at this initial stage of the examination procedure, it appears that all independent claims do not fulfill the requirements of Art. 33 (1) PCT because they are not novel in the sense of Art. 33 (2) PCT.

Claims 1, 12, 22, and 25 have been amended and now deal with a "music reproducing apparatus **for use** in a telephony terminal apparatus [...]". However, this specification has to be read as "music reproducing apparatus **suitable for use** in a telephony terminal apparatus [...]" and therefore does not define any other subject-matter than in the claims as originally filed.

An apparatus that therefore falls within the scope of any of the aforementioned claims is an ensemble of a computer, such as the Atari ST or common PCs, in conjunction with standard MIDI-programs, which are in widespread use since the 1980s. Such computers standardly have had access to the Internet at least since the mid-1990s, therefore they also were telephony terminals as defined in claim 6. An example of such an ensemble is described in the document D1.

It does not appear that the other independent claims and dependent claims define subject-matter that would not be anticipated by such an ensemble as described above.

Patentable subject-matter

It does not appear to have been entirely impossible that a limitation to the domain of portable telephones with their characteristic restrictions in memory, size and data transfer rate might have resulted in a set of claims fulfilling the requirement of novelty, at least on the basis of the documents available at the time of search.

PTO/PCT Rec'd 05 FEB 2002

REPLACEMENT

ART 34 A

10/049351

MUSIC REPRODUCING APPARATUS, MUSIC REPRODUCING METHOD AND
TELEPHONE TERMINAL DEVICE

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SPECIFICATION

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a music reproducing
apparatus and a music reproducing method suitable for use in
10 a car telephone or portable telephone.

Related Art

In portable telephone systems such as PDC (Personal
Digital Cellular Telecommunication System) known as analog or
digital cellular systems, or PHS (Personal Handy-Phone
15 Systems), a telephone terminal device rings to alert a user
at the time of arrival of a call. Conventionally, the alert
was made by beeping sound, but it has recently replaced by a
melody because the beeping sound is a kind of noise offensive
to the ear.

20 The above-mentioned type of conventional telephone
terminal device can generate a melody, but the melody is far
from satisfactory quality.

To solve this problem, the use of a music piece
reproducing apparatus with an automatic performance function
25 has been considered effective. Such a conventional music
piece reproducing apparatus capable of automatic performance
includes a central processing unit (CPU), a read only memory

example, due to low speed of data processing by the data processing means, the telephone terminal device can reproduce a piece of music with a variety of tones of high quality.

Further, since the amount of timbre data is reduced, timbre data enough to reproduce a piece of music with tones of high quality can be stored even in a timbre data storage means, the storage capacity of which is smaller.

According to another aspect of the present invention, when a vacant area is created in the musical score storing memory, a next portion of the musical score data is subsequently loaded into the memory. By such a construction, a music piece of a high quality requiring a great data volume can be reproduced even though the music score storing memory has a small capacity.

Further, the CPU is not required to execute the music reproduction process, but simply executes a data transfer process of feeding a next portion of the music score data when a vacant area is yielded in the memory buffering the music score data. Therefore, the CPU of moderate speed may be sufficient to reproduce the high quality of the melody tones.

BRIEF DESCRIPTION OF THE DRAWINGS

By way of example and to make the description more clear, reference is made to the accompanying drawings, in which:

Fig. 1 is a diagram showing the concept of how to download music data to portable telephones when a music piece reproducing apparatus of the present invention that embodies

a music piece reproducing method of the present invention is applied to the potable telephones;

Fig. 2 is a diagram showing an embodiment of a music piece reproducing apparatus of the present invention that embodies a music piece reproducing method of the present invention when the music piece reproducing apparatus is applied to a potable telephone;

Fig. 3 is a diagram showing an exemplary configuration of a music piece reproducing unit as practiced in the music piece reproducing apparatus of the present invention that embodies the music piece reproducing method of the present invention;

Fig. 4 is a diagram showing an example of a musical score data format used in the music piece reproducing apparatus according to the embodiment of the present invention;

Fig. 5 is a diagram showing an example of a timbre data format for eight tone colors written in a timbre data storage unit (Voice RAM) in the music piece reproducing apparatus according to the embodiment of the present invention;

Fig. 6 is a diagram showing an example of a format of timbre allocation data used in the music piece reproducing apparatus according to the embodiment of the present invention;

Fig. 7 is a diagram showing the detailed arrangement of an FIFO in the music piece reproducing apparatus according to the embodiment of the present invention;

Fig. 8 is a diagram for explaining the operation of the

FIFO in the music piece reproducing apparatus according to the embodiment of the present invention;

Fig. 9 is a flowchart showing music piece reproduction support processing executed by a system CPU in a portable telephone to which the music piece reproducing apparatus of the present invention is applied;

Fig. 10 is a diagram showing a configuration of a frequency modulation type of tone generator as an example of the tone generator in the music piece reproducing apparatus according to the embodiment of the present invention;

Fig. 11 is a diagram showing a configuration of another frequency modulation type of tone generator as an example of the tone generator in the music piece reproducing apparatus according to the embodiment of the present invention;

Fig. 12 is a diagram showing an example of a timbre data format for eight tone colors written in the timbre data storage unit (Voice RAM) by using a frequency modulation type of tone generator as the tone generator in the music piece reproducing apparatus according to the embodiment of the present invention; and

Fig. 13 is a diagram showing a detailed format of the timbre data shown in Fig. 12.

DETAILED DESCRIPTION OF THE INVENTION

Fig. 1 is a diagram showing the concept of how to download music data to portable telephones as telephone terminal devices when a music piece reproducing apparatus of the present invention that embodies a music piece reproducing

method of the present invention is applied to the portable telephones.

Systems for portable telephones are typically adopting cellular or cell splitting methods that install many radio-zones called cells in a service area. Each radio-zone is managed by one of cell sites or base stations A (2a) through D (2d). When users make calls from portable telephones 1 and 101 as mobile stations to ordinary telephones, the calls are first connected to a mobile telephone exchange station through a base station that manages the radio-zone to which the portable telephones now belong, then from the mobile telephone exchange station to a general telephone network. The portable telephones 1, 101 are connected through radio channels to the base station responsible for the radio-zone so that they can make calls to other telephones.

Fig. 1 shows an example of this type of cellular system. Shown in Fig. 1 is a case where the portable telephones 1, 101 are located within a radio-zone managed by a base station C(2c) in the base stations A(2a) through D(2d). The portable telephones 1, 101 are connected to the base station 2c through radio channels so that the base station 2c will receive and process upward signals when the telephones make calls or perform location registration. Although the base stations 2a through 2d are responsible for different radio-zones, the outer edges of the base stations may overlap each other. The base stations 2a through 2d are connected to a mobile exchange station 3 through a multiplexing network, and plural mobile exchange stations are consolidated by a gate

exchange station 4, then connected to a general telephone exchange station 5a. Plural gate exchange stations 4 provided in this system are connected to each other through a relay transmission line. general telephone exchange stations 5 a, 5b, 5c, are located at each local area with a relay transmission line connecting them. Each of the general telephone exchange stations 5a, 5b, 5c, establishes connection with ordinary telephones. Then, in this case, a download center 6 is connected to the general telephone exchange station 5b.

At the download center 6, new pieces of music are collected at any time and a large number of music data are stored. According to the present invention, music data can be downloaded to the potable telephones 1, 101 from the download center 6 that is connected to the general telephone network. When the potable telephone 1 downloads music data, the user carrying the potable telephone 1 dials a telephone number of the download center 6, so that the potable telephone 1 is connected to the download center 6 in a path from the potable telephone 1 to the download center 6 through the base station 20, the mobile exchange station 3, the gate exchange station 4, the general telephone exchange station 5a and the general telephone exchange station 5b. Then, the user operates dial buttons and the like on the potable telephone 1 according to the menu indicated on its display to download music data associated to a desired music title. In this case, the music data is composed of musical score data and timbre data. Using the above-mentioned method, only the

timbre data indicative of a variety of tones or the musical score data may be downloaded to the potable telephone 1 individually.

Fig. 2 illustrates an embodiment of a music piece reproducing apparatus of the present invention that embodies a music piece reproducing method of the present invention when the music piece reproducing apparatus is applied to a potable telephone as a telephone terminal device.

In Fig. 2, the potable telephone 1 includes an antenna 1a that is generally retractable. The antenna 1a is connected to a communication unit 13 having modulation and demodulation functions. A central processing unit (CPU) 10 of the system is a system control part that executes telephone function programs to control the operation of each part in the potable telephone 1. The system CPU 10 has a timer that measures an elapsed time in operation and generates a timer interrupt at certain intervals. Upon receipt of an interrupt request signal, the system CPU 10 executes auxiliary operations to support music piece reproduction processing to be described later. A system RAM 11 is a RAM (Random Access Memory) that provides a storage area for music data composed of musical score data and timbre data downloaded from the download center 6, a user setting data storage area, a work area for the system CPU 10, and so on. A system ROM 12 is a ROM (Read Only Memory) that stores several kinds of telephone function programs, such as to handle outgoing and incoming calls, executed by the system CPU 10, other programs for execution of auxiliary operations

34 is set according to the timbre allocation data so that each part will generate a music signal with the pitch and the duration of tone generation determined according to the timbre parameters supplied from the sequencer 33. The music signals generated for four parts are supplied to a digital/analog converter (DAC) 36 at predetermined reproduction timing to generate an analog music signal. The music signal is then decoded at the voice data processing unit 14 and mixed with a receiver signal by means of a mixer 37.

The following describes the operation of the music piece reproducing unit shown in Fig. 3. The user carrying the portable telephone 1 as shown in Fig. 2 selects a desired piece of music from information related to music such as music titles displayed on the display 18 in a music piece reproducing mode. Then, music data corresponding to the selected piece are read out of the system RAM 11 and sent to the music piece reproducing unit 15 through the bus 24. Of the timbre data of eight tone colors in the music data fetched through the interface 30, index data attached to the timbre data are decoded at the index decoder 32 and supplied and written as index data AD2 to the timbre data storage unit (Voice RAM) 34. The timbre data to be written to the timbre data storage unit (Voice RAM) 34 can be selected from many kinds of timbre data stored in the system RAM 11 before transfer.

Fig. 5 illustrates an example of a timbre data format for eight tone colors written in the timbre data storage unit

the musical score data are read out of the FIFO 31, so that the music signals reproduced from the tone generator 35 are outputted to the DAC 36.

As the piece of music is reproducing, the interrupt request signal (IRQ) is given to the system CPU 10 each time an available area detected in the FIFO 31 becomes equal to the IRQ point data value. Upon receipt of the IRQ, the system CPU 10 reads the next musical score data for a predetermined number of words (31-IRQ point) from the system RAM 11, and sends the same to the bus 24. The musical score data are written into the available area in the FIFO 31 through the interface 30. Such write operation as to write the next musical score data for the predetermined number of words (31-IRQ point) into the FIFO 31 is repeatedly executed. Therefore, even if the musical score data contain many words of data, all the data words can be written in the FIFO 31 after all. The musical score data read out of the FIFO 31 are then reproduced and outputted from the tone generator 35 according to the tempo data. Thus, according to the present invention, a large amount of music data can be treated that allow the music piece to be reproduced with high quality even in a case where the FIFO 31 has such a small storage capacity, for example, only 32 words of music data.

Suppose that the music piece reproducing unit 15 is set to reproduce a piece of music when a call arrives at the potable telephone 1. When a call arrives at the potable telephone 1, the above-mentioned music piece reproduction processing is so executed that a music signal outputted from

Timbre parameters corresponding to the timbre number are read out of the timbre data storage unit (Voice RAM) 34, and set in a tone generator register of the tone generator 35 for the part specified by the timbre allocation data. The timbre of the part concerned to be reproduced on the tone generator 35 is thus changed during the reproduction.

As discussed above, since the timbre allocation data for each part is inserted in the musical score data, the timbre of each part can be voluntarily changed during the reproduction. Further, the timbre data of eight tone colors stored in the timbre data storage unit (Voice RAM) 34 may be selected by the user out of all the timbre data stored in the system RAM 11, so that the selected timbre data can be transferred to the timbre data storage unit (Voice PAM) 34. Since the system RAM 11 has many kinds of timbre data downloaded from the download center 6 or the external equipment 20, any timbre data from among the timbre data of many kinds can be selectively stored into the timbre data storage unit (Voice RAM) 34.

Fig. 9 is a flowchart illustrating music piece reproduction support processing executed by the system CPU 10 during the reproduction of a piece of music. When the portable telephone 1 is changed to the music piece reproducing mode, a music piece reproducing menu appears on the display 18. In step S1, the user selects a desired piece of music from the music selection menu by operating the dial buttons and the like. In this case, the selection is made from music data stored in the system RAM 11 and the system ROM 12. The

CLAIMS

1. A music reproducing apparatus comprising:

5 a timbre data memory that has a limited capacity for
storing timbre data corresponding to a first number of
timbres, which is less than a second number of timbres
reserved in a data source;

an interface that can be operated to transfer the timbre
data from the data source to the timbre data memory so that
10 the timbre data memory stores the transferred timbre data;

a score data memory that stores score data representing
a music piece;

a tone generator that is set with a tone generating
parameter derived from the score data stored in the score
15 data memory for generating tones of the music piece; and

a performance controller that interprets the score data
to read out timbre data designated by the score data from the
timbre data memory for setting the tone generator with the
read timbre data so that the tone generator can generate the
20 tones having timbres specified by the score data according to
the read timbre data.

2. The music reproducing apparatus according to claim 1,
wherein the tone generator can concurrently generate a third
25 number of tones allotted to respective parts of the music
piece, which are not more than the second number of timbres

available by the timbre data memory, and the performance controller reads out timbre data corresponding to the third member of timbres which are assigned to the respective parts according to the score data.

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3. An electronic apparatus comprising:

a processor that processes data to execute a task;

a memory device that memorizes data including music data comprised of timbre data and score data to represent music

10 pieces; and

a music reproduction device that operates according to the music data under control by the processor to reproduce a music piece in association with the task executed by the processor, wherein the music reproduction device comprises:

15 a timbre data memory that has a limited capacity for storing timbre data corresponding to a first number of timbres, which is less than a second number of timbres reserved in the memory device;

20 an interface that can be operated to transfer the timbre data from the memory device to the timbre data memory so that the timbre data memory stores the transferred timbre data;

a score data memory that stores score data representing a music piece;

25 a tone generator that is set with a tone generating parameter derived from the score data stored in the score data memory for generating tones of the music piece; and

a performance controller that interprets the score data to read out timbre data designated by the score data from the timbre data memory for setting the tone generator with the read timbre data so that the tone generator can generate the
5 tones having timbres specified by the score data according to the read timbre data.

4. The electronic apparatus according to claim 3, wherein the tone generator can concurrently generate a third number
10 of tones allotted to respective parts of the music piece, which are not more than the second number of timbres available by the timbre data memory, and the performance controller reads out timbre data corresponding to the third member of timbres which are assigned to the respective parts
15 according to the score data.

5. The electronic apparatus according to claim 3, further comprising a communication device that can communicate with an external database to download therefrom music data into
20 the memory device.

6. A telephony terminal apparatus having a communication unit that transmits a signal to a remote location and receives a signal from the remote location, and a music
25 reproduction unit that can reproduce a music piece in association with the signal, wherein

the music reproduction unit comprises:

a score data memory that memorizes score data
representing a music piece;

a tone generator of a frequency modulation type settable
5 with parameters for generating harmonics by frequency
modulation to synthesize a tone; and

a performance controller that sets the tone generator
with parameters according to the memorized score data for
enabling the tone generator to synthesize tones of the music
10 piece represented by the score data.

7. The telephony terminal apparatus according to claim 6,
wherein the music reproduction unit further comprises a
timbre data memory that has a limited capacity for memorizing
15 timbre data corresponding to a predetermined number of
timbres, and the performance controller interprets the score
data to read out timbre data corresponding to a timbre
designated by the score data from the timbre data memory, and
sets the tone generator according to the read timbre data to
20 thereby enable the tone generator to synthesize the tones of
the music piece having the timbre designated by the score
data.

8. The telephony terminal apparatus according to claim 7,
25 wherein the music reproduction unit further comprises an
interface that can transfer data including the timbre data

between the music reproduction unit and other units, the interface being operated for transferring the timbre data to the music reproduction unit so as to load the timbre data memory.

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9. The telephony terminal apparatus according to claim 8, further comprising a central processing unit that treats various data and a memory unit that reserves various data including music data composed of score data and timbre data, wherein the interface is operated under control by the central processing unit for transferring the timbre data from the memory unit to the timbre data memory of the music reproduction unit and for transferring the score data from the memory unit to the score data memory of the music reproduction unit.

15

10. The telephony terminal apparatus according to claim 9, wherein the memory unit reserves timbre data corresponding to a first number of timbres, wherein the timbre data memory of the music reproduction unit memorizes timbre data being transferred from the memory unit and corresponding to a second number of timbres which are less than the first number of timbres, wherein the tone generator can concurrently generate a third number of tones allotted to respective parts of the music piece, which are not more than the second number of timbres available by the timbre data memory, and wherein

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the performance controller reads out timbre data from the timbre data memory corresponding to the third member of timbres which are assigned to the respective parts according to the score data.

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11. The telephony terminal apparatus according to claim 9, wherein the communication unit can receive a signal representing either of the score data and the timbre data so as to download the same into the memory unit.

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12. A music reproducing apparatus comprising:

a score data memory that has a limited space for storing a part of score data, which represents a music piece and which can be provided from a data source;

15

an interface that can be operated to load the score data from the data source into the score data memory;

a tone generator that is set with a variable parameter derived from the score data for sequentially generating tones of the music piece;

20

a performance controller that sequentially retrieves the score data from the score data memory so as to set the tone generator with the variable parameter according to the retrieved score data; and

25

a memory monitor that detects when a vacant area is created in the limited space of the score data memory upon sequential retrieval of the score data for operating the

interface to load another part of the score data into the vacant area, thereby enabling the tone generator to continue the generating of the tones of the music piece.

5 13. The music reproducing apparatus according to claim 12, further comprising a timbre data memory that stores timbre data corresponding to a number of timbres, wherein the performance controller reads out timbre data corresponding to a timbre designated by the score data from the timbre data
10 memory, and sets the tone generator with the read timbre data, thereby enabling the tone generator to generate the tones of the music piece having the designated timbre.

14. An electronic apparatus comprising:
15 a processor that processes data to execute a task;
a memory device that memorizes data including score data representative of a music piece; and
a music reproduction device that operates according to the score data under control by the processor to reproduce a
20 music piece in association with the task, wherein the music reproduction device comprises:
a score data memory that has a limited space for storing a part of score data, which represents a music piece and which can be provided from the memory device;
25 an interface that can be operated to load the score data from the memory device into the score data memory;

a tone generator that is set with a variable parameter derived from the score data for sequentially generating tones of the music piece;

5 a performance controller that sequentially retrieves the score data from the score data memory so as to set the tone generator with the variable parameter according to the retrieved score data; and

a memory monitor that notifies the processor when a vacant area is created in the limited space of the score data
10 memory upon sequential retrieval of the score data, so that the processor operates the interface to load another part of the score data from the memory device into the vacant area of the limited space of the score data memory, thereby enabling the tone generator to continue the generating of the tones of
15 the music piece.

15. The electronic apparatus according to claim 14, further comprising a timbre data memory that stores timbre data corresponding to a number of timbres, wherein the performance
20 controller reads out timbre data corresponding to a timbre designated by the score data from the timbre data memory, and sets the tone generator with the read timbre data, thereby enabling the tone generator to generate the tones of the music piece having the designated timbre.

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16. The electronic apparatus according to claim 14, further

comprising a communication device that can communicate with an external database to download therefrom score data into the memory device.

- 5 17. A method of reproducing a music piece comprising the steps of:

providing a timbre data memory that has a limited capacity capable of storing timbre data corresponding to a first number of timbres, which is less than a second number
10 of timbres reserved in a data source;

operating an interface to transfer the timbre data from the data source to the timbre data memory so that the timbre data memory stores the transferred timbre data;

storing score data representing a music piece in a score
15 data memory;

setting a tone generator with a tone generating parameter derived from the score data stored in the score data memory for generating tones of the music piece; and

interpreting the score data to read out timbre data
20 designated by the score data from the timbre data memory for setting the tone generator with the read timbre data so that the tone generator can generate the tones having timbres specified by the score data according to the read timbre data.

- 25 18. A method of reproducing a music piece from an electronic apparatus having a processor that processes data to execute a

task, a memory device that memorizes data including music data comprised of timbre data and score data to represent music pieces, and a music reproduction device that operates according to the music data under control by the processor to
5 reproduce a music piece in association with the task executed by the processor, the method comprising the steps of:

providing the music reproduction device with a timbre data memory that has a limited capacity capable of storing timbre data corresponding to a first number of timbres, which
10 is less than a second number of timbres reserved in the memory device;

operating an interface to transfer the timbre data from the memory device to the timbre data memory so that the timbre data memory stores the transferred timbre data;

15 storing score data representing a music piece in a score data memory of the music production device;

setting a tone generator of the music reproduction device with a tone generating parameter derived from the score data stored in the score data memory for generating
20 tones of the music piece; and

interpreting the score data to read out timbre data designated by the score data from the timbre data memory for setting the tone generator with the read timbre data so that the tone generator can generate the tones having timbres
25 specified by the score data according to the read timbre data.

19. A method of reproducing a music piece by a telephony terminal apparatus having a communication unit that transmits a signal to a remote location and receives a signal from the remote location, and a music reproduction unit that can
5 reproduce a music piece in association with the signal, the method comprising the steps of:

providing the music reproduction unit with a score data memory that memorizes score data representing a music piece;

providing the music reproduction unit with a tone
10 generator of a frequency modulation type settable with parameters for generating harmonics by frequency modulation to synthesize a tone; and

setting the tone generator with parameters according to the memorized score data for enabling the tone generator to
15 synthesize tones of the music piece represented by the score data.

20. A method of reproducing a music piece comprising the steps of:

20 providing a score data memory that has a limited space capable of storing a part of score data, which represents a music piece and which can be provided from a data source;

operating an interface to load the score data from the data source into the score data memory;

25 setting a tone generator with a variable parameter derived from the score data for sequentially generating tones

of the music piece;

sequentially retrieving the score data from the score data memory so as to set the tone generator with the variable parameter according to the retrieved score data; and

5 detecting when a vacant area is created in the limited space of the score data memory upon sequential retrieval of the score data for operating the interface to load another part of the score data into the vacant area, thereby enabling the tone generator to continue the generating of the tones of
10 the music piece.

21. A method of reproducing a music piece from an electronic apparatus having a processor that process a data to execute a task, a memory device that memorizes data including score
15 data representative of a music piece and a music reproduction device that operates according to the score data under control by the processor to reproduce a music piece in association with the task, the method comprising the steps of:

20 providing the music reproduction device with a score data memory that has a limited space capable of storing a part of score data, which represents a music piece and which can be provided from the memory device;

operating an interface to load the score data from the
25 memory device into the score data memory;

setting a tone generator of the music reproduction

device with a variable parameter derived from the score data for sequentially generating tones of the music piece;

sequentially retrieving the score data from the score data memory so as to set the tone generator with the variable parameter according to the retrieved score data; and

notifying the processor when a vacant area is created in the limited space of the score data memory upon sequential retrieval of the score data, so that the processor operates the interface to load another part of the score data from the memory device into the vacant area of the limited space of the score data memory, thereby enabling the tone generator to continue the generating of the tones of the music piece.

22. A machine readable medium for use in a music reproducing apparatus having a processor, the medium containing program instructions executable by the processor for causing the music reproducing apparatus to perform a method comprising the steps of:

preparing a timbre data memory that has a limited capacity capable of storing timbre data corresponding to a first number of timbres, which is less than a second number of timbres reserved in a data source;

operating an interface to transfer the timbre data from the data source to the timbre data memory so that the timbre data memory stores the transferred timbre data;

storing score data representing a music piece in a score

data memory;

setting a tone generator with a tone generating parameter derived from the score data stored in the score data memory for generating tones of the music piece; and

5 interpreting the score data to read out timbre data designated by the score data from the timbre data memory for setting the tone generator with the read timbre data so that the tone generator can generate the tones having timbres specified by the score data according to the read timbre data.

10

23. A machine readable medium for use in an electronic apparatus having a processor that processes data to execute a task, a memory device that memorizes data including music data comprised of timbre data and score data to represent
15 music pieces, and a music reproduction device that operates according to the music data under control by the processor to reproduce a music piece in association with the task executed by the processor, the medium containing program instructions executable by the processor for causing the electronic
20 apparatus to carry out a method comprising the steps of:

allotting the music reproduction device with a timbre data memory that has a limited capacity capable of storing timbre data corresponding to a first number of timbres, which is less than a second number of timbres reserved in the
25 memory device;

operating an interface to transfer the timbre data from

the memory device to the timbre data memory so that the timbre data memory stores the transferred timbre data;

loading score data representing a music piece in a score data memory of the music reproduction device;

5 setting a tone generator of the music reproduction device with a tone generating parameter derived from the score data loaded in the score data memory for generating tones of the music piece; and

 interpreting the score data to read out timbre data
10 designated by the score data from the timbre data memory for setting the tone generator with the read timbre data so that the tone generator can generate the tones having timbres specified by the score data according to the read timbre data.

15 24. A machine readable medium for use in a telephony terminal apparatus having a central processing unit, a communication unit that transmits a signal to a remote location and receives a signal from the remote location, and a music reproduction unit that can reproduce a music piece in
20 association with the signal, the medium containing program instructions executable by the central processing unit for causing the telephony terminal apparatus to perform a method comprising the steps of:

 allotting the music reproduction unit with a score data
25 memory that memorizes score data representing a music piece;
 providing the music reproduction unit with a tone

generator of a frequency modulation type settable with parameters for generating harmonics by frequency modulation to synthesize a tone; and

5 setting the tone generator with parameters according to the memorized score data for enabling the tone generator to synthesize tones of the music piece represented by the score data.

25. A machine readable medium for use in a music reproducing apparatus having a processor, the medium containing program instructions executable by the processor for causing the music reproducing apparatus to perform a method comprising the steps of:

15 providing a score data memory that has a limited space capable of storing a part of score data, which represents a music piece and which can be provided from a data source;

 operating an interface to load the score data from the data source into the score data memory;

20 setting a tone generator with a variable parameter derived from the score data for sequentially generating tones of the music piece;

 sequentially retrieving the score data from the score data memory so as to set the tone generator with the variable parameter according to the retrieved score data; and

25 detecting when a vacant area is created in the limited space of the score data memory upon sequential retrieval of

the score data for operating the interface to load another part of the score data into the vacant area, thereby enabling the tone generator to continue the generating of the tones of the music piece.

5

26. A machine readable medium for use in an electronic apparatus having a processor that processes data to execute a task, a memory device that memorizes data including score data representative of a music piece and a music reproduction
10 device that operates according to the score data under control by the processor to reproduce a music piece in association with the task, the medium containing program instructions executable by the processor for causing the electronic apparatus to perform a method comprising the steps
15 of:

allotting the music reproduction device with a score data memory that has a limited space capable of storing a part of score data, which represents a music piece and which can be provided from the memory device;

20 operating an interface to load the score data from the memory device into the score data memory;

setting a tone generator of the music reproduction device with a variable parameter derived from the score data for sequentially generating tones of the music piece;

25 sequentially retrieving the score data from the score data memory so as to set the tone generator with the variable

parameter according to the retrieved score data; and

notifying the processor when a vacant area is created in the limited space of the score data memory upon sequential retrieval of the score data, so that the processor operates
5 the interface to load another part of the score data from the memory device into the vacant area of the limited space of the score data memory, thereby enabling the tone generator to continue the generating of the tones of the music piece.

INTERNATIONAL SEARCH REPORT

Application No

00/05199

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G10H1/00 G10H1/24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G10H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 837 451 A (YAMAHA CORP) 22 April 1998 (1998-04-22) column 2, line 29 - line 49 column 6, line 12 - line 31 column 10, line 20 -column 12, line 45; figures 1-3	1,3,5, 17,18, 22,23
A	EP 0 531 670 A (RICOS KK) 17 March 1993 (1993-03-17) column 4, line 11 -column 5, line 30; figure 1 --- -/--	12,14, 20,21, 25,26



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

6 November 2000

Date of mailing of the international search report

14/11/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Pulluard, R

INTERNATIONAL SEARCH REPORT

Application No.

00/05199

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>EP 0 372 678 A (TSUMURA MIHOJI) 13 June 1990 (1990-06-13)</p> <p>column 13, line 50 -column 15, line 23; figures 7-9</p> <p>-----</p>	<p>3,5,12, 14,18, 20,21, 23,25,26</p>

INTERNATIONAL SEARCH REPORT

in patent family members

Application No

00/05199

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0837451 A	22-04-1998	JP 10177380 A	30-06-1998
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		US 5046004 A	03-09-1991

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference H7353W0	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/JP 00/ 05199	International filing date (day/month/year) 03/08/2000	(Earliest) Priority Date (day/month/year) 05/08/1999
Applicant YAMAHA CORPORATION		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

3

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No.

EP 00/05199

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G10H1/00 G10H1/24

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Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G10H

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EPO-Internal, WPI Data

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Pulluard, R

INTERNATIONAL SEARCH REPORT

International Application No

JP 00/05199

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

on patent family members

International Application No

JP 00/05199

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			US 5046004 A	03-09-1991